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ABSTRACT

A study investigated the effectiveness of the Students Achieving Independent Learning (SAIL) program, an educator-developed approach to transactional strategies instruction (TSI). Five groups of six previously low-achieving second-grade students received a year of transactional strategies instruction and five groups of six students received a year of more conventional reading instruction provided by teachers who were highly regarded by school district personnel. Each of the 10 groups was housed in a different classroom, with each SAIL group matched to a comparison group that was close in reading achievement level and matched demographically to the school providing the SAIL group. By the end of the academic year, there was clear evidence of greater knowledge and use of strategies by the TSI students, greater acquisition of information from material read in reading group, and superior performance on standardized reading tests. Findings suggest a clear validation to date of educator-developed transactional strategies instruction. (Contains 5[illegible] references and five tables of data. A sample SAIL lesson is attached.) (Author/RS)

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A Quasi-Experimental Validation of Transactional Strategies Instruction with Previously Low-Achieving, Second-Grade Readers

Rachel Brown
State University of New York at Buffalo

Michael Pressley
State University of New York at Albany

Peggy Van Meter
University of Maryland College Park

Ted Schuder
Maryland State Department of Education

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Winter 1995

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Maryland State Department of Education

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318 Aderhold
University of Georgia
Athens, Georgia 30602-7125
(706) 542-3674 Fax: (706) 542-3678
INTERNET: NRRC@uga.cc.uga.edu

NRRC - University of Maryland College Park
2102 J. M. Patterson Building
University of Maryland
College Park, Maryland 20742
(301) 405-8035 Fax: (301) 314-9625
INTERNET: NRRC@umail.umd.edu

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The National Reading Research Center (NRRC) is funded by the Office of Educational Research and Improvement of the U.S. Department of Education to conduct research on reading and reading instruction. The NRRC is operated by a consortium of the University of Georgia and the University of Maryland College Park in collaboration with researchers at several institutions nationwide.

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National Reading Research Center
318 Aderhold Hall
University of Georgia
Athens, GA 30602-7125
(706) 542-3674

John T. Guthrie, Co-Director
National Reading Research Center
2102 J. M. Patterson Building
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About the Authors

Rachel Brown is an assistant professor in the Department of Counseling and Educational Psychology, the State University of New York at Buffalo. Her research interests include text comprehension, strategies instruction, and instructional computing.

Michael Pressley is a Professor in the Department of Educational Psychology and Statistics, the State University of New York at Albany. He has studied strategies instruction extensively since the 1980s and is an authority in the field of cognitive reading strategies instruction.

Peggy Van Meter is a doctoral student in the Department of Human Development at the University of Maryland College Park. Her specialization is in the area of educational psychology. She currently is working as a research assistant for the National Reading Research Center.

Ted Schuder is a specialist in the Research and Development division of the Maryland State Department of Education. He has developed strategies-based interventions and conducted professional development workshops for teachers on strategies instruction.

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Rachel Brown
State University of New York at Buffalo

Michael Pressley
State University of New York at Albany

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University of Maryland College Park

Ted Schuder
Maryland State Department of Education

Abstract. *Previously low-achieving second-grade students received either a year of transactional strategies instruction (TSI) or a year of more conventional reading instruction provided by teachers who were highly regarded by school district personnel. By the end of the academic year, there was clear evidence of greater knowledge and use of strategies by the TSI students, greater acquisition of information from material read in reading group, and superior performance on standardized reading tests. This is the clearest validation to date of educator-developed transactional strategies instruction.*

Since Durkin's (1979) seminal finding that American students receive little instruction about how to comprehend text, there have been extensive efforts to identify teachable strategies to increase students' understanding and memory of text. Early on research strategies (for reviews, see Dole, Duffy, Roehler, & Pearson, 1991; Pressley, Johnson, Symons, McGoldrick, & Kurita, 1989) tended to focus on instruction of individual strategies and improvements in narrowly defined performances, such as performance on standardized comprehension tests following instruction in reading strategies. The typical research method used in these studies was to teach one group of students to use a particular cognitive strategy during reading, while comparison-group students used their own resources to understand text as best

they could. Through this approach, a relatively small number of strategies—for example, visualizing ideas in text, summarizing, and self-questioning—proved effective in increasing elementary students' comprehension and memory of text. The single-strategy investigations demonstrated that when students were under exceptionally strong instructional control (i.e., they were told when and where to use a particular strategy), they could use that strategy to improve comprehension and learning. But single-strategy instruction was rarely observed; there was no evidence of generalized improvement in reading.

Based on what is now known about skilled reading, it is not surprising that improvement in reading required more than instruction in single strategies. During the late 1970s and early 1980s, a number of analyses of skilled reading were conducted (e.g., Johnston & Afflerbach, 1985; Lytle, 1982; Olshavsky, 1976-77; Olson, Mack, & Duffy, 1981; see Pressley & Afflerbach, in press, for a summary). It became apparent that skilled reading did not involve the use of a single potent strategy but rather, the orchestration of a complex repertoire of cognitive processes. This understanding—that skilled readers coordinate a number of strategies while reading—partially fueled researchers' efforts to develop instructional interventions that involve teaching multiple comprehension strategies (Baker & Brown, 1984).

Palincsar and Brown's *reciprocal teaching approach* (1984) was one of these researcher-designed, multiple-strategies interventions. The researchers taught students to apply four strategies to expository text as they read: *generate predictions*, *ask questions*, *seek clarification*, and *summarize content*. The students used these strategies in reading groups, with the adult teacher gradually turning over responsibility for strategic processing as much as possible to students. Palincsar and Brown's idea, consistent with Vygotsky's (e.g., 1978) theory of socially mediated learning, was that participation in reading-group discussions that involve predicting, questioning, seeking clarification, and summarizing would lead to the internalization of these processes. In fact, a month or two of such instruction produces noticeable improvement in the use of the focal strategies but only modest improvement on standardized reading tests (for a review, see Rosenshine & Meister, 1994).

In addition to Palincsar and Brown's study, there were other attempts to teach multiple comprehension strategies. Some involved presenting a large number of strategies quickly; these typically failed to produce improvements in elementary readers' comprehension (e.g., Paris & Oka, 1986). Other interventions involved more intensive, direct explanation and modeling of small repertoires of strategies; these approaches generally were more successful in improving reading (e.g., Bereiter & Bird, 1985; Collins, 1991; Duffy et al., 1987).

Many educators became aware of researchers' successes with strategies instruction and began to import such instruction into their classrooms. It became apparent, however, that when strategies instruction was successfully deployed in schools, it involved much more than the type of instruction typically studied in the well-controlled experiments (e.g., the teaching of single strategies or the quick pre-

sentation of many strategies; see Pressley, Goodchild, Fleet, Zajchowski, & Evans, 1989). This motivated Pressley and his colleagues to study the use of comprehension strategies instruction in elementary schools (see Pressley & El-Dinary, 1993).

After investigating several educator-developed programs, the research group headed by Pressley proposed that effective comprehension instruction in elementary grades was "transactional" in three senses of the term (Pressley, El-Dinary, et al., 1992). First, readers learn to *link text content to prior knowledge*, as they construct meaning: this is consistent with Rosenblatt's (1978) use of the term. Second, since much of strategies instruction occurs in reading groups, group members use strategies to construct meaning together—transactional activity in the sense that *understanding constructed by the group differs from the personalized interpretations individuals would have generated on their own.* This is consistent with the use of the term in organizational psychology (e.g., Hutchins, 1991). Third, *the responses of all members of the group (including the teacher's instructional decisions and practices) are determined in part by those of others in the group*. This is "transactional" as the term is used by social development researchers (Bell, 1968).

Since the instruction studied in elementary school classrooms was transactional in these three senses, the research team called it *transactional strategies instruction* (TSI). The short-term goal of TSI is the joint construction of reasonable interpretations by group members as they apply strategies to texts. The long-term goal is the internalization and adaptive use of strategic processing whenever students encounter demanding text. Both goals are promoted by teaching reading group members to emulate expert readers' use of comprehension strategies when they attempt to understand challenging text (e.g., Pressley & Afflerbach, in press; Wyatt et al., 1993): Expert readers plan ahead as they read; they are goal-oriented; they combine their background knowledge with text cues to create meaning, use a variety of strategies (e.g., from seeking the important information in text to noting details), monitor their comprehension, attempt to solve their comprehension problems, and evaluate their understanding and performance (e.g., by asking Is the content believable? Is the piece well written? Am I achieving my goals?). The result is a personalized, interpretive understanding of text.

At the outset of our work, little was known about how students are taught to become more skillful and independent readers. A variety of qualitative methods had been used in the descriptive studies of TSI (see Pressley, El-Dinary, Gaskins, et al., 1992). These included ethnographies; interviews involving questions emanating from Pressley, Goodchild et al.'s (1989) tentative description of strategies instruction; interviews constructed to illuminate observations made in program classrooms; long-term case studies; and analyses of classroom discourse. Although the TSI programs differed in their particulars, there were a number of common components (Pressley, El-Dinary, et al., 1992):

- Strategy instruction is long-term; effective strategies instructors offer it in their

classrooms throughout the school year. The ideal is for high-quality process instruction to occur across school years.

- Teachers explain and model effective comprehension strategies. Typically, a few, r[illegible]rategies are emphasized, including those aimed at improving students' memory (e.g., associating new information to previously learned information), comprehension (e.g., constructing mental images to represent text content), and problem solving (e.g., rereading sections of text that are difficult to understand).

- Throughout instruction, the usefulness of strategies is emphasized; students are reminded frequently about the comprehension gains that accompany strategy use. Information about when and where various strategies can be used is commonly discussed.

- Teachers coach students to use strategies on an as-needed basis, providing hints to students about potential strategic choices they might make. There are many spontaneous mini-lessons about the use of particular strategies.

- Both teachers and students demonstrate the use of strategies for one another, thinking aloud as they read. Teachers consistently model the flexible use of strategies; students explain to one another how they use strategies to process text.

- The strategies are used as a vehicle for coordinating dialogue about text. Thus, a great deal of discussion of text content occurs as teachers interact with students, reacting to students' use of strategies and prompting additional strategic processing (see especially Gaskins et al., 1993). In particular, when students relate text to their prior knowledge, construct summaries of text meaning, visualize information covered in a text, and predict what might transpire in a story, they engage in personal interpretation of text, with these personal interpretations varying from child to child and reading group to reading group (Brown & Coy-Ogan, 1993).

Although the qualitative studies provided in-depth understanding of the nature of TSI programs, and a variety of informal data attested to the strengths of these programs (e.g., approximations to controlled comparisons conducted by school district officials; see Brown & Pressley, 1994), there were no formal comparisons of students who received TSI with students who received more conventional instruction. There were several important challenges to making such comparisons.

One challenge was to determine what should be measured. Reading strategies instruction has tended to focus on gains on one or a few traditional measures of reading performance (Pressley, El-Dinary, et al., 1992). It became clear during the qualitative studies, however, that TSI probably affects student cognition in a number of ways of consequence to teachers, with both short-term and long-term

effects. The cognitive benefits perceived by teachers include greater awareness of reading processes, increased interpretation of text, more extensive use of background knowledge, and enhanced comprehension (see Pressley, Schuder, Teachers in the Students Achieving Independent Learning Program, Bergman, & El-Dinary, 1992).

A second challenge was that many of the presumed effects of such an intervention appear in the long-term—that is, at a minimum, only after a semester or more of such instruction (see Marks et al., 1993; Pressley, El- Dinary, Gaskins, et al., 1992; Pressley, Schuder, et al., 1992). A credible evaluation, therefore, had to be long-term. But students often move in and out of schools at a high rate; thus, holding large groups of students together for several years was impractical. Our solution was to evaluate one year of TSI, since one year of intervention was all we believed could be completed in the participating district with an intact sample of students.

A third challenge was that the random assignment of teachers to conditions in such a study was out of the question. Becoming an effective transactional strategies teacher takes several years (e.g., El-Dinary & Schuder, 1993; Pressley, Gaskins, Cunicelli, et al., 1991; Pressley, Schuder, et al., 1992). Thus, we could not take just any group of teachers and randomly assign them to TSI or to comparison conditions. Moreover, we could not randomly assign accomplished transactional strategies teachers to teach some other approach for a year. Our solution was to use a quasi-experimental design involving accomplished TSI teachers and other teachers in the same district—teachers with reputations as excellent reading educators whose instruction followed the guidelines of the district's regular literacy curriculum.

Before proceeding with a description of the formal methods in our study, we summarize some of the most important features of the educator-developed approach to TSI evaluated here: the Students Achieving Independent Learning (SAIL) program (Bergman & Schuder, 1992). A description of SAIL will permit readers to understand our expectations in this quasi-experiment.

SAIL Comprehension Strategies Instructional Program

The purpose of SAIL is to develop independent, self-regulated readers. The program was developed over the course of a decade in one mid-Atlantic school district (see Schuder, 1993, for a history of SAIL). SAIL students are taught to adjust their reading to their specific purpose and to text characteristics (e.g., Is the material interesting? Does it relate to the reader's prior knowledge? What genre does the text fit? How difficult is the text?). SAIL students are instructed to predict upcoming events (narration) or information (exposition), alter expectations as text unfolds, generate questions and interpretations while reading, visualize represented ideas, summarize periodically, and attend selectively to the most important information. Students are taught to think-aloud (e.g., Meichenbaum, 1977) as they practice applying comprehension strategies during reading-group instruction. For example, they reveal their thinking to others when they

talk about their past experiences in relation to text content. All of these reading processes are taught through direct explanations provided by teachers, teacher modeling, coaching, and guided practice, both in reading groups and independently.

SAIL students are also taught methods for dealing with difficult words, including skipping them, using context clues to determine the meaning of hard-to-decode and unfamiliar words, and rereading for additional clues to meaning. They are taught that getting the overall meaning of text is more important than understanding every word and that sometimes, difficult words can be skipped with little or no loss in meaning—a skillful reader practice.

When SAIL instruction occurs in reading groups, it differs in a number of ways from more conventional reading-group instruction: (1) Pre-reading discussion of vocabulary is eliminated in favor of discussion of vocabulary in the context of reading. (2) The almost universal classroom practice of asking comprehension-assessment questions as students read in groups (e.g., Mehan, 1979) is rarely observed in TSI (Gaskins, Anderson, Pressley, Cunicelli, & Satlow, 1993). Instead, a teacher encourages students to construct and evaluate an interpretation of text. Teachers can gauge students' literal comprehension by having them think aloud after reading a text segment. (3) There are extended interpretive discussions of text; these discussions emphasize student application of strategies to text.

Although reading group is an important instructional context for SAIL, the teaching of strategies extends across the school day—during whole-class instruction and as teachers interact individually with their students. Reading instruction is also an across-the-curriculum activity. When students read science or social studies texts, they are encouraged to use the same comprehension and problem-solving strategies they use when reading literature. For example, they are asked to make predictions, activate their background knowledge, construct mental representations of the text, summarize important information, and clarify confusions by rereading or using semantic and picture clues. A sample SAIL lesson is provided in the Appendix. The lesson highlights key features described in this section and enables readers to compare SAIL with other strategies instructional approaches (e.g., reciprocal teaching; Palincsar & Brown, 1984).

Hypotheses

Three hypotheses were evaluated here: (1) that instruction in SAIL would enhance reading comprehension as measured by a standardized test; (2) that there would be clear indications of this improvement after a year of SAIL instruction, and (3) that students would develop deeper, more personalized and interpretive understandings of text after a year of SAIL instruction.

These hypotheses were evaluated with previously low-achieving, second-grade students—a group targeted by SAIL. SAIL was designed originally for elementary students in first or second grade who were at risk for reading failure. It is intended as a dramatically richer and more engaging form of instruction than the skill-and-drill approaches so often delivered to at-risk students (Allington, 1991).

Thus, the evaluation reported here involved contrasting the achievement of previously low-achieving, second-grade students who had participated in SAIL with five matched groups of second-grade students receiving high-quality, but more conventional reading instruction.

METHODS

Participants

Teachers. The five TSI teachers and the five teachers in comparison classrooms served in the same school district in which the SAIL program was developed. Eight of the teachers taught second-grade. One SAIL teacher had first- and second-graders in her class; one comparison teacher had second- and third-graders in her class. All teachers were female. The SAIL teachers had an average of 10.4 years of experience in teaching; the comparison teachers averaged 23.4 years. The five SAIL teachers exhausted the pool of second-grade teachers in the district with extensive experience teaching in the SAIL program (i.e., three or more years; range = three to six years). The comparison teachers were recommended by principals and district reading specialists, with nominations of effective teachers based on criteria such as (1) giving students grade-level-appropriate tasks, (2) providing motivational learning activities, (3) using classroom management well to avoid discipline problems, (4) fostering active student involvement in reading, (5) monitoring student understanding and performance, and (6) fostering academic self--esteem in students. The comparison teachers were eclectic in their instructional practices, blending the whole- language tradition favored in the school district with elements of skill and other traditional forms of reading instruction. The comparison- group teachers had not participated in any SAIL professional development activities.

All participating teachers were administered DeFord's (1985) *Theoretical Orientation to Reading Profile* (TORP), a 28-item instrument discriminating among teachers who identify with phonics, skills, and whole-language orientations ($r = .98$). The scoring is such that those favoring phonics-based reading instruction score lower than those favoring skills instruction—who, in turn, score lower than those identifying with whole language (scores range from 28 to 140). The SAIL teachers' mean score was 113 ($SD = 9.7$), and the comparison teachers averaged 73 ($SD = 7.2$), with the SAIL teachers differing significantly from the comparison teachers, dependent t (4) $= 6.24$, $p < .05$. (The dependent t test was calculated since SAIL and comparison teachers were subsequently matched on school demographical information and participating students' fall standardized test performances. When particular items of the TORP were examined, it was clear that the SAIL teachers had a more whole-language orientation than the comparison teachers, who endorsed phonics and skills more often, smallest $|t(4)| = 4.88$, $p < .05$ for any of the three subscales. This was as expected, since SAIL encourages meaning- making as the goal of reading and discourages teaching of skills in isolation, which is consistent with whole-language approaches. Informal observations of the comparison teachers over the year confirmed that they were

more eclectic in their approach to reading instruction than the SAIL teachers, incorporating a balance of whole-language, phonics-based, and skills-based instruction. Thus, their more balanced appraisal of the TORP items was consistent with our observations of their teaching.

At the beginning of the study, the 10 participating teachers were also administered a 25-item, researcher-constructed questionnaire tapping their beliefs about teaching (r = .94; Cronbach's alpha was calculated using participants' responses). Some items were generated after observing SAIL and non-SAIL instructors during a pilot study conducted the previous year. Other statements were adaptations of questions or Likert-type items developed earlier by Pressley and his associates for interview studies (Pressley, Schuder, et al., 1992) and by SAIL program developers for formative evaluation purposes. The final version of the interview form was reviewed by the second author and a SAIL program developer to evaluate whether the items would identify salient differences between SAIL and non-SAIL teachers.

The questions were not direct; subjects responded to Likert-type statements (i.e., on a strongly agree to strongly disagree scale). For example, teachers who endorse TSI were expected to respond affirmatively to statements like, "The most important message to convey to students is that reading and thinking are inseparably linked," and, "During instruction, teachers should ask story-related questions that have no precisely right or wrong answer." SAIL teachers were expected to disagree with items such as, "Worksheets that enable students to practice comprehension skills can be very useful for low-group students," and, "During reading instruction, teachers need to guide students toward one best interpretation of a story." The responses were scored so that consistency with TSI would result in a low score (maximum score = 120; one item was discarded). The scores of the SAIL teachers ranged from 25 to 45 on this scale (M = 36.8, SD = 9.5); comparison teachers' scores ranged from 62 to 76 (M = 70.8, SD = 5.3), a significant difference, dependent $t(4) = -8.84$, $p < .05$. In short, there were multiple indicators at the outset of the study that the SAIL teachers were committed to a different approach to teaching than the conventional teachers and that the SAIL teachers' beliefs about teaching were consistent with TSI philosophy.

Students. Student participants were assigned to second grade but were reading below grade level at the beginning of the year. They were identified as such through informal testing (teacher assessments involving reading of graded basal passages and word lists), results from assessments administered as part of the Chapter 1 program, and the previous year's grades and reports. Based on these criteria, six to nine students in each class were identified as potentially eligible to participate. Unfortunately, none of the assessments used by the school district to classify readers as weak at the beginning of the year were standardized measurements, although there was converging evidence from informal measures that all participants experienced at least some difficulty reading beginning-level, second-grade material.

SAIL and comparison classes in the study were matched on the basis of student mobility

patterns, Chapter 1 status, ethnic and minority composition, size and location, and performance on standardized tests. A comprehension subtest of the *Stanford Achievement Test* (SAT; Primary 1, Form J; Grade level 1.5–2.5 [The Psychological Corporation, 1990]) was administered in late November or early December (depending on the class) of the school year to the six to nine students previously identified in each class. Administration of this test occurred then because only then did the teachers feel that participating students could function somewhat independently at the 1.5 grade level. Unfortunately, this required the administration of the test after SAIL teachers had introduced SAIL strategies, so it was not a perfect pretest.

From those considered eligible, six students in each of the paired classes were matched on the basis of their reading comprehension scores ($n = 60$). A pair consisted of one SAIL class and one comparison class ($n = 5$ pairs). All of the children participating in the study spoke and comprehended English. In addition, the sample included no children experiencing severe attentional or behavioral problems. From first to second semester, one SAIL student and two comparison students in one pair left their classrooms. Back-up students were substituted, with no significant difference occurring between the newly constituted groups on the fall reading comprehension subtest.

With a maximum raw test score of 40, the SAIL classes in the study averaged 22.20 on the comprehension subtest of the SAT ($SD = 6.85$) at the late fall testing, and the comparison classes averaged 22.67 ($SD = 5.89$), a nonsignificant difference (means per class analyzed), $t(4) = -0.59, p > .05$. Although not used for matching, the word skills subtest from the same standardized instrument was also administered (maximum score = 36 for the subtest), SAIL mean = 20.97 ($SD = 2.76$) and comparison mean = 21.10 ($SD = 3.40$), $t(4) = -0.10, p > .05$. The comparability of the paired groups is reflected in their means and standard deviations on the fall Stanford reading comprehension subtest (see Table 1).

Although the six children from each classroom are referred to here as a reading group, their instruction varied through the year. First, reading was most often taught in homogenous groups, although it also occurred during individualized and whole-class instruction Second, participants did not always remain members of the same homogeneous group over the course of the year (e.g., students who made great progress became members of another group). Since the SAIL program was offered to all children in the SAIL classrooms and the instruction in comparison classrooms did not resemble SAIL instruction, variable grouping did not pose a problem with respect to fidelity of treatment. The six participating children in each classroom did meet as a homogenous group for lessons that were formally analyzed, however. Even so, our use of the term "reading group" implies no more than the six targeted children who received either SAIL or conventional instruction daily, always within their classrooms, frequently in small groups, and sometimes, as an intact group.

Design

This was an academic-year-long, quasi-experimental study, carried out in 1991-92. The

Table 1. Stanford Achievement Test, Comprehension Subtest: Means and Standard Deviations for Paired Groups, Fall Administration

	SAIL		*Non-SAIL*	
	M	*SD*	*M*	*SD*
1	20.83	6.94	20.33	7.92
2	19.67	6.47	20.00	8.07
3	15.67	4.63	16.83	6.24
4	21.00	6.23	24.00	6.60
5	33.83	7.28	32.17	6.88

reading achievement of five groups of six previously low-achieving, second-grade students receiving SAIL instruction was compared with the reading achievement of five groups of six previously low-achieving, second-grade students receiving instruction typical of the district. Each of the 10 groups was housed in a different classroom, with each SAIL group matched to a comparison group that was close in reading achievement level at the beginning of the study and matched demographically to the school providing the SAIL group. The reading-group mean—not individual student scores was considered the unit of analysis.

A quasi-experimental design was selected because it was impossible to randomly assign teachers to instructional conditions. Although we might have attempted to identify potential comparison teachers in the building where SAIL teachers taught and randomly assigned students to those teachers, we chose not to do this for two reasons: (1) we did not want SAIL and non-SAIL participants to communicate with each other during the study; and (2) we did not want the identification of potential teachers limited to the same schools. Instead, we sought the most competent comparison teachers in the district. Since these teachers did not serve in the same buildings as the SAIL teachers, random assignment of children to teachers was impossible as well. We believe the option we selected was a fair test of SAIL relative to highly regarded, more conventional reading instruction. Thus, the standardized testing (to check for a priori differences) and the matching of students was used to compensate for the lack of randomization. Despite the limitation of quasi-experimental studies, we believe this evaluation is stronger than other classroom-based studies that do not adopt such compensatory measures.

Dependent Measures

The dependent measures are described in the order in which they were administered during the academic year. All measures were administered by the same researcher; a summary of the measures appears in Table 2.

Strategies interview. In October and November (i.e., when SAIL instruction was being introduced to SAIL students) and in March and April, a strategies interview was administered to all students participating in the study. This

Table 1. Description of Data Sources for Students

Data Source	When Given	Why Given	Description
Strategy Interview	October/ November	To assess initially SAIL and non-SAIL Classes' declarative and metacognitive knowledge of comprehension and problem-solving strategies	Semistructured interview consisting of five base questions that were followed up with nondirective prompts; the questions were administered orally and individually to students.
Standardized Subtests:	November/ December	To form comparable SAIL and non-SAIL Stanford Achievement Test, Reading groups by matching students using reading comprehension scores	Comprehension Subtest, Primary 1, Form J
Word Skills	November/ December	To measure initially SAIL and non-SAIL classes on a traditional, standardized and validated measure of word recognition skills	Stanford Achievement Test, Word Study Skills Subtest, Primary 1, Form J
Retelling Questions	March/ April	To assess students' retelling and sequencing of two stories presented by each teacher	Students individually were asked cued and picture-cued retelling questions
Strategy Interview	March/ April	To compare SAIL and non-SAIL classes' knowledge of strategies	Students were posed the same five interview questions they were asked in the fall during the assessment
Think-aloud Task	May/ June	To compare SAIL and non-SAIL classes' self-regulated use of strategies during story reading; to determine if students were more text- or reader-based in their responses to think-aloud prompts	Students were stopped and asked "What are you thinking?" and other nondirective follow-up prompts at four fixed points during story reading; students were questioned individually
Reading Comprehension	May/ June	To compare SAIL and non-SAIL classes on a traditional, standardized, and validated measure of reading comprehension	Stanford Achievement Test, Reading Comprehension Subtest, Primary 1, Form K
Word Skills	May/ June	To compare SAIL and non-SAIL classes on a traditional, standardized, and validated measure of word skills	Stanford Achievement Test, Word Study Skills Subtest, Primary 1, Form K

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interview tapped students' knowledge about strategies.

Five open-ended questions (adapted from ones used by Duffy et al., 1987) were administered orally and individually to each participating student:

1. What do good readers do? What makes someone a good reader?

2. What things do you *do* before you start to read a story?

3. What do you *think* about before you read a new story?

4. What do you do when you come to a word you do not know?

5. What do you do when you read something that does not make sense?

These questions were presented in a different order for each student. If initial student responses were unclear or terse, the researcher probed for clarifications and/or elaborations.

Story lessons and recall questions. In March or April (depending on class schedule), two stories were presented to all participating reading groups. The instruction and interactions that occurred during reading were recorded on videotape and were analyzed to document differences in instruction in SAIL and in comparison reading groups. After the lesson, each student was asked to retell the story to the researcher, followed by a task requiring subjects to sequence pictures corresponding to events in the story.

All children in the study read two illustrated stories. "Fox Trot" was a chapter in a popular children's trade book, *Fox in Love* (Marshall, 1982); "Mushroom in the Rain" (Ginsburg, 1991) was from the *Heath Reading Series*, Book Level 1. The readability for the 341-word "Fox Trot" was 2.4; the readability for the 512-word "Mushroom in the Rain" was 2.2 (Harris-Jacobson Wide Range Readability Formula; Harris & Sipay, 1985, pp. 656–673). Of the two, "Fox Trot" was the more challenging story because: (1) it had a higher readability level; (2) it required students to make more inferences about the characters; and (3) it used vocabulary far less repetitively than "Mushroom in the Rain."

In "Fox Trot," the main character, Fox, decides to enter a dance contest. He asks each of two friends to be his dance partner, but each refuses. They both suggest that Fox ask Raisin, but he is reluctant to do so because she is angry with him. Nevertheless, he asks and she agrees. They practice hard and dance well together, but on the day of the contest, Raisin gets the mumps. Fox returns home and despondently sits in front of a blank television screen. Then he decides to teach his little sister the dance steps. They rush to the contest and win second prize.

In "Mushroom in the Rain," an ant seeks shelter from a storm. She squeezes herself under a small mushroom. A butterfly comes by and asks if he can escape the rain as well, and the ant allows the butterfly to crowd in. Then comes a mouse and a bird; crowding under the mushroom increases. A rabbit arrives with a fox in hot pursuit. The others hide the rabbit under the mushroom. Once the fox leaves and the rain stops, the ant asks the others how they

managed to fit under the mushroom. A frog, sitting on top of the mushroom asks, "Don't you know what happens to a mushroom in the rain?" In the version of the story used in the study, the answer was not provided to the children but was left for them to infer.

These stories were selected because they provided ample opportunity for diverse interpretations and personal responses. They were on the school system's approved list and were judged by the participating teachers as appropriate for a single lesson for weaker students late in the academic year. Three of the matched pairs of reading groups—one SAIL group and one comparison group to a pair—read "Mushroom in the Rain" first; two pairs read "Fox Trot" first.

All decisions about how to teach the stories were made by the teachers. However, they were asked to teach each of these stories in one morning lesson, not to exceed 55 minutes in length. The mean SAIL lesson lasted 43.40 minutes (SD = 7.83) and the mean comparison-group lesson lasted 35.50 minutes (SD = 13.34). The lessons were videotaped in order to verify that teaching in the SAIL groups was different from teaching in the comparison reading groups.

Approximately two hours after each lesson, each of the six students in the reading group was interviewed individually. First, students were asked to retell the story:

> Pretend that you are asked to tell the story to other kids in the class who have never heard the story before. What would you tell them happened in that story? . . . Can you remember anything else? (Adapted from Golden, 1988)

This was followed by a cued, picture-retelling task. Students were asked to sequence six scrambled pictures taken directly from the story. The students were then informed that sometimes pictures assist in aiding recall of stories, and they were asked to use the pictures to prompt recollection of story content.

Think-aloud measures. In May/June, students read a 129-word illustrated Aesop's fable, "The Dog and His Reflection," selected from a trade book (Miller, 1976). The readability was 3.9 (Harris & Sipay, 1985) for this story, and thus it was challenging for the students. Although a text with such a high-readability level may have been too taxing for some students, the accompanying pictures were highly informative. In addition, challenging material was needed to trigger the students' use of strategies.

In the story, a dog steals a piece of meat from the dinner table. He runs into the woods and starts to cross a bridge. When he chances to look down, he sees his reflection in the water. Thinking his reflection is another dog with a larger cut of meat, he decides to seize the other dog's chop. When he opens his mouth, his own piece of meat plunges into the water. Consequently, the dog ends up with nothing at all.

The students met with the researcher individually for this task. Students were stopped four times during the reading of the fable and asked to report their thinking. If a student had difficulty reading a segment, the first question posed was, What do you think happened on this page? Otherwise, the only question posed was, What are you thinking? When students offered unelaborated responses to these questions, open-ended follow-ups (see

Garner, 1988, p. 70) were asked, such as, Can you tell me more? or Why do you say that? Sometimes an unelaborated comment was echoed back to the student in the form of a question. For example, after a student remarked that a dog stole a piece of meat from his master's table, the researcher might have asked, What do you think about the fact that the dog stole a piece of meat from his master's table? For every text segment, before the student moved on to reading the next segment, the researcher asked, "Is there anything you could say or do before reading on?"

Stanford Achievement Test subtests. In May/June, students took the *Stanford Achievement Test* (The Psychological Corporation, 1990), Form K, Reading Comprehension and Word Study Skills subtests. The Reading Comprehension subtest consists of two-sentence stories, comprehension questions about short passages, and sentence completion items that form short stories. The Word Skills subtest includes questions pertaining to structural analysis (i.e., compound words, inflectional endings, contractions) and phonetic analysis (i.e., consonants and vowels). The comprehension test was administered first to all students followed by the word skills test. The alternate-forms reliability for the full-scale scores of Forms J (administered in the fall) and K was .89.

RESULTS

Each hypothesis reported here was one-tailed. That is, each evaluated whether SAIL instruction produced better performance than the comparison instruction. Most means appeared in only one hypothesis test and hence, $p < .05$ was the Type 1 error rate selected for all hypotheses (see Kirk, 1982, for this and all references to statistics). For the standardized test data and strategies interview data, the simple effect of condition was tested in the fall, and again in the spring. The Time (of testing) × Condition interaction was also tested. With each hypothesis tested at Type 1 error rate $p < .05$, the overall Type 1 error rate for the analysis of the three dependent variables (i.e., the standardized comprehension, standardized vocabulary, and strategy interview) did not exceed .15. The same overall Type 1 error rate would have applied for each dependent variable if we had analyzed the data with a 2 × 2 analysis of variance model. Analysis of variance was not considered here since the effects it tests were not precisely matched to the important hypotheses in this investigation.

All tests were based on the reading-group mean as the unit of analysis (i.e., $n = 5$ groups for the SAIL condition and $n = 5$ groups for the comparison condition), since individual scores within reading groups were not independent. Finally, all t tests were dependent t tests based on the five matched pairs, with one SAIL and one comparison group to a pair; pairings were determined by the reading groups' fall standardized comprehension performances. Thus, the cutoff value for determining statistical significance for every comparison reported in this results section was $t(4) = 2.13$, $p < .05$ (one-tailed).

Fall/spring strategies interview. The interviews were designed to determine whether SAIL and comparison students would differ in the number of strategies they claimed to use

during reading. Two raters scored 20% of the interviews, with an overall 87% agreement for the strategies named by students. Differences were negotiated and resolved. Only one of the two raters scored the remainder of the interviews.

A strategy was scored as mentioned if it was named in response to any of the interview questions. Any strategies mentioned by students were recorded, even if they were not strategies taught in the SAIL program. The comprehension strategies mentioned included the following:

Predicting: Guessing what will happen next

Verifying: Confirming that a prediction was supported by text, background knowledge, or reason

Visualizing: Constructing a mental picture of the information contained in the text segment

Relating prior knowledge/personal experiences to text: Making an association between information in the text and information in the reader's head

Summarizing/retelling: Saying the most important information (summarizing) or restating in one's own words everything that occurred in the text segment just read

Thinking aloud: Verbalizing thoughts and feeling about text segments just read

Monitoring: Explicitly verbalizing when something just read does not make sense

Setting a goal: Deciding a purpose prior to reading, including decisions about both expository and narrative texts

Browsing/previewing: Flipping through the story, glancing at the pictures, or reading the back cover to get ideas about the story

Skipping: Ignoring a problematic part of text and reading on

Substituting/guessing: Replacing a difficult part of text with something else that seems to make sense and maintains the coherence of the text segment

Rereading: Returning to a problematic segment of text

Looking back: Looking back in the text for information that might help in understanding a difficult part of text

Clarifying confusions: Asking a specific question to resolve a comprehension problem

Asking someone for help: Asking another student or the teacher for help with a confusing section of text

The following strategies for attacking unknown or difficult words were mentioned:

Table 3. Means and Standard Deviations for Number of Comprehension and Word-Level Strategies Mentioned in the Fall and Spring Strategies Interviews

Comprehension Strategies

Fall				Spring			
SAIL		Comparison Group		SAIL		Comparison Group	
M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
0.80	0.45	0.66	0.44	4.20	0.86	1.21	0.40
(SAIL not significantly greater, $t(4) = 0.65$)				(SAIL significantly greater, $t(4) = 9.73$)			

Word-Level Strategies

Fall				Spring			
SAIL		Comparison Group		SAIL		Comparison Group	
M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
2.12	0.74	1.15	0.28	3.22	0.63	1.60	0.55
(SAIL significantly greater, $t(4) = 3.61$)				(SAIL significantly greater, $t(4) = 4.88$)			

Skipping: Ignoring a problematic word and reading on

Substituting/guessing: Replacing an unknown word with another word that appears to make sense or that maintains the coherence of the text

Rereading: Returning to a problematic word in context

Looking back: Looking back in the text for information that might help in understanding a difficult word

Using picture clues: Looking at pictures in the story to help determine the meaning of an unknown word or difficult piece of text

Using word clues: Relying on the surrounding text to help decide the meaning of an unknown word or difficult piece of text

Breaking a word into parts: Seeing if there are recognizable root words, prefixes, or suffixes contained within the larger word

Sounding out a word: Applying knowledge of phonics to the decoding of the word

Table 4. Strategy Interview Analysis: Baseline and Postmeasure Mean Frequencies for Comprehension Strategies Mentioned or Described During Interviews, by Group

	Baseline Measure		Postmeasure	
Strategy	SAIL *M*	Non-SAIL *M*	SAIL *M*	Non-SAIL *M*
Predict	0.84	0.37	4.30	1.84
Reread	1.67	0.54	2.56	1.34
Skip/keep going	0.17	0.57	2.47	0.83
Visualize	0.00	0.17	1.77	0.00
Ask someone for help	0.51	1.46	1.60	1.00
Relate to prior knowledge/ personal experiences	0.34	0.00	1.57	0.17
Summarize/retell	0.00	0.00	1.20	0.00
Set a goal	0.17	0.00	1.00	0.00
Think aloud	0.17	0.00	0.87	0.00
Clarify confusions using text or picture clues	0.17	0.00	0.83	0.17
Substitute/guess	0.00	0.20	0.67	0.51
Browse	0.00	0.00	0.67	0.00
Verify	0.00	0.00	0.54	0.00
Look back	0.00	0.00	0.53	0.00
Monitor/say something doesn't make sense	0.00	0.00	0.40	0.33

Note. Frequencies were calculated by summing class means for each group (SAIL, non-SAIL) on each strategy.

Asking someone for help: Asking another student or the teacher for help with the confusing word

The comprehension and word-level strategies reported are summarized in Table 3. The means reported in the table are reading-group means. That is, a mean frequency of strategies reported for each reading group in the study was calculated based on individual reading group members' reports. The Table 1 means and standard deviations were based on five reading-group means. With respect to reports of comprehension strategies, there was no significant advantage for the SAIL students in the fall, shortly after the program had begun. By spring, however, as expected, the SAIL groups reported many more strategies than the comparison groups (see Table 4). In the spring, only SAIL students talked about visualizing, looking back, verifying predictions, thinking aloud, summarizing, setting a goal, or browsing. Although comparison-group students mentioned predicting, using text or picture clues to clarify confusions, making connections between text and their background knowledge

Table 5. Strategy Interview Analysis: Baseline and Postmeasure Mean Frequencies for Word Strategies Mentioned or Described During Interviews, by Group

	Baseline Measure		Postmeasure	
Strategy	SAIL *M*	Non-SAIL *M*	SAIL *M*	Non-SAIL *M*
Skip/ignore	3.99	0.94	4.33	1.34
Substitute/guess	1.67	0.00	2.64	0.17
Sound it out	1.83	2.70	2.16	2.85
Use picture clues	0.66	0.20	2.10	0.00
Reread	0.83	0.00	1.87	0.84
Look back	0.00	0.00	1.27	0.17
Break into parts/ word clues	0.34	0.17	1.18	0.00
Ask someone for help	0.34	1.56	0.34	2.00
Skip and return/ use context	1.01	0.20	0.17	0.67

Note. Frequencies were calculated by summing class means for each group (SAIL, non-SAIL) on each strategy.

and experiences, asking someone for help, skipping over confusing parts, and rereading, during the spring interview, the frequency of such reports was always greater for the SAIL group than for the comparison group. The SAIL and comparison groups mentioned monitoring and guessing approximately equally on the spring interview.

With respect to word-level strategies, the SAIL students reported more strategies than the comparison-group participants, even during the fall interview. In the fall, SAIL students mentioned skipping words, substituting/guessing, using picture or word clues, rereading, and breaking words into parts descriptively more often than did comparison students (see Table 5). There was more mention of sounding out words in the comparison condition in the fall. The introduction to SAIL in the fall months probably accounts for this fall difference in word-level strategies reports. By the spring, all of the word-level strategies were being mentioned by SAIL students (see Table 5). In contrast, the word-level strategies mentioned consistently by more than one student per comparison reading group were skipping an unknown word, sounding it out, rereading, using context clues, and asking someone for help.

We also tested whether SAIL students made greater gains in self-reported knowledge of strategies over the course of the year. The one-tailed interaction hypothesis test (e.g., fall-to-spring increase in students' strategies scores by condition) was significant as expected for both the comprehension strategies, $t(4) = 7.49$, and the word-level strategies, $t(4) = 4.30$.

In summary, by spring the SAIL students reported more comprehension and word-level strategies during the interview than did comparison-group students. That SAIL students

were already reporting more word-level strategies in the fall than comparison students probably reflected the effects of the first month or two of instruction in the program. Although students were introduced to a few comprehension strategies prior to the fall interview, such as predicting and thinking aloud, teachers heavily emphasized the fix-up word strategies to provide their weaker readers with tools they could apply to text. By spring, all but two strategies were mentioned more often in the SAIL group than in the comparison group. The exceptions were *sounding it out* (which was consistent with the teaching philosophy of the comparison teachers) and *asking for help* with a word (which is difficult to construe as a strategy associated with independence in reading). Most importantly, SAIL students learned more about comprehension and word-level strategies over the year than comparison students.

Spring Story Lessons

Teaching the lessons. The March/April lessons were transcribed from the videotape records, and four raters read the transcriptions. One rater was a SAIL program developer, and the other three were graduate students familiar with TSI and with the SAIL program in particular. The program developer correctly classified 9 of the 10 SAIL lessons as consistent with the intent and purpose of the SAIL program. This rater was sensitive to whether teachers explained and modeled strategic processes for students and encouraged the interpretive construction of text meaning through the use of comprehension strategies. The program developer looked for evidence that the teachers thought aloud in their lessons and coached students to engage text actively (i.e., relate text content to prior knowledge as well as apply other strategies as appropriate). He classified all of the comparison lessons as inconsistent with the SAIL approach and, in fact, they were not even close to being consistent with SAIL. The three graduate students correctly classified lessons as SAIL or non-SAIL for 59 of the 60 ratings made. Thus, there were clear instructional differences between the SAIL and non-SAIL classrooms during the March/April lessons.

Two raters reviewed the lessons for evidence of strategies teaching, with interrater agreement of 85% and disagreements resolved by discussion. Collapsing across the two lessons observed for each teacher, a mean of 9.20 (SD = 1.92) different comprehension strategies were observed in the SAIL lessons compared to a mean of 2.00 (SD = 0.71) in the comparison lessons, $t(4) = 7.43$. *Predicting*, *relating text to background knowledge*, *summarizing*, and *thinking aloud* were observed in all SAIL groups. Only *relating to background knowledge* was observed in all comparison groups. In no SAIL group were fewer than seven of the comprehension strategies taught; in no comparison group were more than three observed.

On average, again collapsing across each participating reading groups' two lessons, 4.80 (SD = 0.45) word-level strategies were observed in the SAIL groups and 4.00 (SD = 0.71) were documented in the comparison reading groups, $t(4) = 4.00$. *Using semantic context clues* and *picture clues* were observed in all SAIL groups; *using picture clues* and *sounding words out* were observed in all compari-

son classrooms. The range of word-level strategies was between 4 and 5 in the SAIL groups and between 3 and 5 in the comparison groups.

Thus, one important indicator that the instruction in the SAIL groups differed from comparison instruction was that there was more strategies instruction in the SAIL groups. The difference was much more striking with respect to comprehension strategies, however.

Student recall of lesson stories. Both "Fox Trot" and "Mushroom in the Rain" were parsed into idea units, a variant of the T-unit (Hunt, 1965). Loosely defined, an idea unit is a segment of written or oral discourse that conveys meaning, consisting of a verb form with its associated subject, object, and/or modifier(s). Length or grammatical structure do not determine whether a segment is coded as an idea unit; what counts is whether the unit is meaningful. Interrater agreement was calculated for 20% of the recalled stories. It was 89% for classification of the protocols into idea units of various types (e.g., literal, interpretive).[1] Differences in classification were resolved through negotiation.

A first issue addressed was whether SAIL students recalled more interpretive idea units than comparison students. These responses reflected students' relating background knowledge to text. Interpretive ideas were not explicitly stated in the text or in the pictures but did not contradict information in the text or pictures. For instance, for the Mushroom story, "He wanted to be dry," was scored as an interpretive remark. (The text had said, "One day an ant was caught in the rain. 'Where can I hide?' he wondered. He saw a little mushroom peeking out of the ground in a clearing and he hid under it.") Also, the comment, "But they tricked him," was scored as an interpretive unit for the Mushroom story. (The corresponding text was, "How could a rabbit get in here? Don't you see there isn't any room," said the ant. The fox turned up his nose. He flicked his tail and ran off.") As a third example, one not corresponding to any exact part of the Mushroom story, the remark, "And it was the only place to keep him dry," was coded as an interpretive remark because it was an inference that did not contradict anything in the text.

For the Mushroom story, SAIL groups averaged 6.12 interpretive units per student (SD = 1.54), which exceeded the corresponding figure of 4.44 in the comparison groups (SD = 1.68), $t(4)$ = 3.03. For "Fox Trot," SAIL groups averaged 5.58 interpretive units per student (SD = 1.63), which exceeded the corresponding figure of 3.78 in the comparison groups (SD = 1.53), $t(4)$ = 3.13.

In addition to scoring interpretive recall, the literal recall of ideas represented either in the stories or in the accompanying pictures was evaluated. For example, one idea unit represented explicitly in the Mushroom story was, "He hid under it." If the student recalled this idea unit or a paraphrase of it, the student was

[1]The recall protocols were analyzed using a modified analytic induction approach (Goetz & LeCompte, 1984). That is, coding categories emerged from analysis of the data. However, identification of categories also was highly informed by the work of O'Flahavan (1989) and Eeds and Wells (1989). In this study, only the results of the literal and interpretive analyses were presented because they directly related to the stated hypotheses. The full categorization scheme and analysis can be found in Brown (1995).

scored as having recalled the unit. In "Fox Trot," there was a picture of Carmen and Dexter looking through a window, watching Fox dance. One idea unit was scored as recalled if the student reported something like, His friends were looking from the window, watching him dance.

For the Mushroom story, SAIL reading groups recalled an average of 17.64 (out of a maximum of 79) literal idea units per student (SD = 3.95), which did not exceed literal recall in the comparison groups who averaged 16.48 units (SD = 1.79), $t(4)$ = 1.11. For "Fox Trot," however, SAIL recall (M = 12.26 out of a maximum of 59 units; SD = 2.72) exceeded comparison group recall (M = 8.22, SD = 2.88), $t(4)$ = 2.66.

Whether students recalled story events in their order of occurrence was assessed as well. A student was scored 0 if their retelling units were recalled in order, collapsing across both unprompted retelling and picture-cued retelling. A student was penalized one point for every retelling unit remembered out of sequence, collapsing across the unprompted and picture-cued retellings. (Again, 20% of the data were checked for interrater agreement; there was 92% agreement). For Mushroom, the mean SAIL-group mean was 0.35 (SD = 0.27) and the mean-comparison group mean was 0.94 (SD = 0.50). For "Fox Trot," the mean SAIL-group mean was 0.41 (SD = 0.18) and the mean comparison-group mean was 0.40 (SD = 0.19). In neither case was SAIL sequencing better than comparison-group sequencing, $|t(4)|$ = 1.81 and $|t(4)|$ = 0.05, $p > .05$, respectively.

In summary, SAIL students were significantly more interpretive in their recalls than the comparison students, consistent with our expectations. There had not been strong expectations about the literal recall of the stories based on condition, for we recognized that the comparison teachers addressed the literal content of stories very well in their lessons. Even so, the students in the SAIL groups recalled more literal information than students in the comparison groups. The difference favoring the SAIL students was significant for the more difficult story. This finding suggests that SAIL student performance may exceed comparison performance when texts become challenging. Although there was a trend favoring the SAIL students for memory of the sequence of events for one story, the sequencing means for the other story were almost identical.

The SAIL story lessons were longer on average than the comparison-group lessons, perhaps accounting in part for why significant results were obtained with respect to recall of stories presented during reading group. However, generally, SAIL lessons are longer because negotiating interpretations, explaining and modeling strategies, coaching, thinking aloud, and selecting and using fix-up strategies while reading are time-consuming activities, particularly when they are compared with some activities in conventional reading lessons (e.g., answering skill-and-drill and literal comprehension questions). Thus, the total time difference between conditions reflects the typical total time difference in lessons between SAIL and non-SAIL instruction.

Spring think-aloud analysis. The think-aloud protocols generated by each student in reaction to Aesop's fable about the dog and his reflection were transcribed and analyzed using a modified analytic induction approach (Goetz

& LeCompte, 1984). Two raters read through all of the protocols, independently taking notes and identifying potential categories of reported reading processes. Through negotiation, a tentative set of process categories was identified, with these then applied by both raters independently to two protocols, one from a SAIL student and one from a comparison-group student The two raters then met and refined the categories in light of the difficulties experienced in scoring these two protocols. The refined categorization was applied to another pair of protocols, again independently by both raters. The refined categorizations captured all of the processes represented in these protocols, and thus, this set of processes was used to code all of the think-aloud protocols. Thus, protocols were coded using the following three categories: (1) strategy-based responding; (2) reader-based responding; or (3) text-based responding.

A response with any indication of strategy use was coded as "strategy-based." The specific strategies used were also coded using the strategy definitions from the strategies interview, with 89% agreement between two raters on 20% of the protocols on these codings of specific strategies. Differences were discussed and subsequently resolved. The mean number of strategies evidenced by SAIL reading-group members (averaging across all groups) was 6.93 (SD = 1.46). The corresponding comparison-group mean was 3.13 (SD = 1.09). The SAIL readers applied significantly more strategies during the think-aloud task than did the comparison-group students, $t(4)$ = 11.07. In fact, there was no overlap in the group means, with SAIL-group means ranging from 5.00 to 8.67 strategies used per student and corresponding comparison-group means ranging from 2.00 to 4.83. All strategies that were scored, except for one (monitoring), were observed descriptively more frequently in the SAIL than in the comparison protocols. The strategies that occurred in the SAIL condition, from most to least frequent, were as follows: *prediction, relating text to prior knowledge, thinking aloud, summarizing, using picture clues, verifying, seeking clarification, monitoring, looking back, visualizing*, and *setting a goal*. The corresponding order for the comparison condition was: *predicting, using picture clues, verifying, relating text to prior knowledge, monitoring, seeking clarification, thinking aloud*, and *looking back. Visualizing, summarizing*, and *setting a goal* never occurred in the comparison-group think-alou ls.

In this example of a strategies-based response, a student reads a page about the dog rushing out of the house with a piece of meat. The SAIL student (S) begins to talk even before the researcher (R) has asked what the student was thinking.

S: I think my prediction is coming out right.

R: Why do you say that?

S: Cuz, cuz I see a bridge over there and water.

The student spontaneously verifies a prediction that he has made earlier by using picture clues. In another example, a different SAIL student has just finished reading that the dog carried the meat over the bridge. The dog

sees his reflection. Thinking it is another dog with an even bigger piece of meat, he wants to have the other dog's meat too:

R: What are you thinking?

S: I'm thinking that he's gonna, uhm, try and get that lamb chop and when he opens his mouth it's gonna fall into the water.

R: Why do you say that?

S: Because it says back here that he's being greedy and he wants that, too.

R: But what makes you think he's gonna open his mouth and it's gonna fall in the water?

S: Well, because, uhm, he has to open his mouth to get the other one.

In this instance, the student makes a prediction using both text clues and background knowledge for support.

We also examined whether SAIL or comparison groups focused more on text- or reader-based information when they did not respond strategically. Responses not classified as "strategies-based" were coded as either "text-based" or "reader-based." (Interrater agreement on 20% of the protocols for classifying text- or reader-based responses was 94%.) Text-based responses contained information explicitly stated or pictured in the story. Reader-based responses reflected a connection between the story and a student's prior knowledge, experiences, beliefs, or feelings.

Proportions were calculated for each class indicating the relationship of text- and reader-based responses to the total number of responses. From these class proportions, SAIL and comparison-group means were computed. The mean for reader-based responses for the SAIL group was .74, SD = .10 (the text-based mean proportion was 1 - .74 = .26, SD = .10). The mean proportion of reader-based responses for the comparison group was .48, SD = 0.15. Thus, the SAIL group produced more reader-based responses than the comparison group, $t(4)$ = 3.98. Without exception, all SAIL classes were proportionally more interpretive than literal in their nonstrategies-based responses. In contrast, only two of five comparison classes were proportionally more interpretive in their responses.

In summary, the SAIL students used strategies on their own more than the comparison students. In addition, the results of the think-aloud analysis supported the recall analyses. That is, SAIL students made significantly more reader-based remarks than comparison students. The SAIL students responded more interpretively, as well as personally.

Spring Standardized Test Performance

In May/June, the SAIL students outperformed the comparison students on the 40-item comprehension subtest. The mean reading-group raw score mean in the SAIL condition was 34.20 (SD = 2.65); the corresponding comparison-group mean was 28.73 (SD = 3.77), $t(4)$ = 4.02 (effect size[es] = 2.54; Cohen, 1988). The SAIL students also outperformed the comparison students on the 36-item word skills subtest in the spring, $t(4)$ = 3.98 (es = 2.51): The mean reading-group raw score mean in the

SAIL condition was 27.10 (*SD* = 2.19); the corresponding comparison-group mean was 24.00 (*SD* = 1.53).

One of the most striking aspects of the spring standardized test data was the much lower variability within SAIL groups than in comparison groups. (The exacting matching of the reading groups in the fall was with respect to both mean performance and variability on standardized reading comprehension, and thus, there was little difference in SAIL and comparison-group variabilities in the fall.) This lower variability is obvious from examination of the standard deviations for each matched pair of reading groups on the spring comprehension subtest:

SAIL Group	*SD*	Comparison Group	*SD*
#1	4.36	#1	9.28
#2	6.26	#2	7.81
#3	1.63	#3	9.94
#4	3.72	#4	8.12
#5	2.40	#5	4.22

The same trend occurred in the word skills data, although it was not quite as pronounced:

SAIL Group	*SD*	Comparison Group	*SD*
#1	4.05	#1	5.75
#2	4.26	#2	5.24
#3	2.80	#3	6.01
#4	2.43	#4	5.73
#5	5.79	#5	5.60

We believed that an especially strong demonstration of the efficacy of the SAIL program would be greater gains on standardized measures over the course of the academic year in SAIL versus the comparison condition (see the summary in the methods section of the fall data). Thus, we tested the size of the fall-to-spring increase in raw scores in the SAIL groups versus the comparison groups. This one-tailed interaction hypothesis test was significant as anticipated for the comprehension subtest, $t(4) = 3.70$ (es = 2.34). The word skills subtest was significant as well, $t(4) = 5.41$ (es = 3.42).

In one of the matched pairs, there were some perfect scores on the comprehension posttest. For this pair of reading groups, a version of the next level of the Stanford comprehension subtest (Primary 2, Form J) was administered. Consistent with the analyses reported earlier, the SAIL-group mean was greater than the matched comparison-group mean, and the SAIL group standard deviation was lower than the comparison-group standard deviation: SAIL mean = 29.8, *SD* = 5.42; comparison-group mean = 21.8, *SD* = 10.17.

In summary, by academic year's end, the second-grade SAIL students clearly outperformed the comparison-group students, with greater improvement on the standardized measures over the course of the academic year in the SAIL condition. Gains in comprehension were expected because, more than anything else, SAIL is intended to increase students' understanding of text. The analogous effects on students' word skills performance was more of a surprise, for we knew that all teachers, regardless of condition, taught phonics and

word-attack skills, albeit at different times of day (e.g., integrated into various content areas) and in different ways (e.g., addressed in the form of worksheets, mini-lessons, etc.).

DISCUSSION

We observed many differences in instruction between SAIL and comparison classes throughout the 1991-92 school year. The differences were apparent in the two lessons that were analyzed in the spring. Neither a SAIL program developer nor several graduate students who were familiar with TSI had difficulty discriminating between transcripts of SAIL and non-SAIL lessons. One important difference highlighted in the analysis of the spring lessons was that discussion of strategies was much more prominent in the SAIL groups than in comparison reading groups. That the differences in teaching were so clear bolsters our confidence in this study as a valid assessment of the efficacy of SAIL with at-risk, second-grade children.

SAIL had positive short-term and long-term effects. In the short-term, students acquired more information from stories read in reading group and developed a richer, more personalized understanding of the stories. Whether the focus is on the amount of literal information recalled from stories covered in reading group or student interpretations of the texts read, these data indicate superior performance by SAIL students versus the comparison students. We infer that SAIL students learn more daily from their reading-group lessons than do students receiving more conventional instruction.

SAIL had long-term effects as well. Consistent with our expectations, the SAIL students were much more conversant about strategic processes by the end of the year than were comparison students. Consistent with our belief that such strategic awareness was developed by the SAIL curricular experiences, strategic awareness increased over the school year significantly more in the SAIL than in the comparison students. SAIL students also used strategies more than did the comparison students, as reflected by their self-reported cognitive processing as they read Aesop's fable at the end of the year. The standardized test performances of the SAIL students also were superior to the comparison students at the end of the year. Most critically, there was significantly greater improvement on standardized measures of reading comprehension from fall to spring in the SAIL versus the comparison classrooms. In short, all measurements of student reading achievement reported here converged on the conclusion that a year of SAIL instruction improves the reading of at-risk, second-grade students.

The study reported here is the strongest formal evidence to date that TSI improves the reading of elementary students. There were many elements controlled in this study that varied freely in more informal comparisons of SAIL and alternative instruction such as those generated by the school district where the program was developed: (1) The student participants were carefully matched in this investigation so that there was no striking difference in their standardized reading achievement at the outset of the study. (2) The teachers were carefully selected. From years of observing and

interviewing committed SAIL teachers, we knew that they were excellent teachers in general, who offer rich language arts experiences for their students. Thus, it was imperative that a compelling evaluation of SAIL be in comparison with excellent, conventional grade-2 instruction. Accordingly, we sought comparison teachers who were highly regarded by district administrators and reading consultants in a district that has garnered numerous national awards for excellence in instruction. (3) The lessons analyzed in the TSI and comparison groups involved the groups processing the same stories. (4) The same dependent measures were administered by the same tester so that measurement experiences were equivalent for participants.

Another strength of this validation was that it relied on multiple assessments of students' reading. Despite current criticisms of standardized tests, we administered one because standardized tests traditionally have been used to evaluate gains in students' reading performance. However, we included assessments of children's memories and interpretations of stories read in class because we felt they reflected better the day-to-day comprehension demands on students than do standardized measures. Although thinking-aloud measures are far from perfect indicators of thinking (Ericsson & Simon, 1980), the assessments of children's thinking as they read Aesop's fable arguably tapped more directly the thinking processes of the children than did the standardized assessments. Thus, we gave students not only a traditional measure of reading believed to be less sensitive to changes in strategic processing but also more process-oriented measures designed to assess strategic processing. Taken together, the results gave a more complete picture of students' reading capabilities than if either type of assessment had been given alone.

Are the outcomes reported here generally significant beyond the specifics of the SAIL program? As we argued earlier (see also Pressley, El-Dinary, Gaskins, et al., 1992), SAIL is an example of reading comprehension strategies instruction as adapted by educators. Long-term, direct explanation and the scaffolded practice of a manageable repertoire of powerful comprehension strategies is an approach replicated in a number of settings (see Pressley & El-Dinary, 1993, for examples). The practice has raced ahead of the science, however, with the educator-developed adaptations being more ambitious in scope, more complex, and ultimately very different from the researcher-validated interventions (e.g., reciprocal teaching) that inspired the educator efforts. There is a very real need to evaluate such adaptations, for there is no guarantee that the strategies instruction validated in basic research studies is effective once it is translated and transformed dramatically by educators.

The research reported here contrasts with true experimental research on strategies instruction in a number of ways. First, the intervention studied here had several components and was nonanalytical with respect to components of the intervention. In other words, we did not attempt to isolate the unique effect of each SAIL component on students' reading performance. In contrast, basic strategies instruction research typically has been much more analytical. Therefore, from a true exper-

imental stance, a multicomponent analysis might introduce confounding. However, we can defend the evaluation of an entire TSI package for two reasons. For one, it is the unit of instruction that interests us. We wanted to know whether or not an instructional package as a whole works, so a study evaluating that whole relative to other, comparable instruction made sense. Furthermore, we were interested in studying naturalistic, classroom-based instruction. In real-life classrooms, multiple treatment interventions naturally occur.

Second, the program of research that includes this study is a blend of qualitative and quantitative research. In contrast, most basic studies of strategies have been only quantitative in nature. We are certain that the quantitative study reported here would have been impossible without the three years of qualitative research leading up to it. At a minimum, that qualitative research affected the selection of dependent measures and the decision to study only accomplished SAIL teachers (see Pressley, Schuder, et al., 1992). More generally, it made obvious to us the scope of an investigation necessary to evaluate TSI so that the treatment was not compromised by the evaluation.

Third, most basic strategies research is designed and conducted by researchers. When educators have participated in basic studies, it has been as delivery agents only. In the program of TSI research, researchers, program developers, and teachers have combined their talents to produce a body of research that realistically depicts TSI and evaluates it fairly. As the study was designed and as it unfolded, school-based educators were consulted frequently about the appropriateness of potential dependent measures and operations of the study. The result has been a much more complete and compelling set of descriptions of TSI, and now we have a thorough appraisal of the impact of one TSI program on second-grade at-risk readers.

One potential alternative interpretation of this study might be that the results observed here reflect the effects of holistic teaching, since SAIL teachers embrace the values of whole language, and SAIL is rich in authentic literature experiences. In fact, the results in this study support claims made in previous qualitative studies of TSI that whole-language-based instruction and TSI share several attributes (Pressley, El-Dinary, et al., 1992; Pressley, Schuder, et al., 1992). However, TSI is not synonymous with whole-language-based instruction. Although SAIL teachers identified themselves more closely with whole-language than with skills or phonics approaches on the TORP, they did not unequivocally endorse whole-language instruction (see the TORP results). Instead, they perceived some key distinctions between TSI and typical whole-language instruction. These differences can be summarized as follows:

> There are . . . some important differences between whole language and transactional strategies instruction, not the least of which is that whole language is more psycholinguistic and philosophical . . . than cognitive. Transactional strategies instruction is directly interventionist, emphasizing modeling, direct explaining, and coaching of

> cognitive processes. In contrast, some whole-language theorists strongly favor discovery, noninterventionist learning. (Pressley, El-Dinary, et al., 1992, p. 528)

These differences, and specifically the explicitness of instruction, may account for why SAIL students outperformed non-SAIL students on the standardized word-attack and reading comprehension measures. We highlight the interventionist role of TSI teachers because whole-language-based instruction, unlike SAIL instruction, has not been shown to have a striking impact on the standardized reading performance of at-risk students (Stahl, McKenna, & Pagnucco, in press; Stahl & Miller, 1989).

As we close this report, we must express a regret. The cost of a study such as this one is great, enough that we doubt there will be a large number of comparative evaluations of TSI. (We have one other currently in progress.) It will not be possible to map out the effects of such instruction with a variety of types of readers, at different grade levels, or with a wide range of TSI options. We have opted instead for depth with respect to description and for evaluation of TSI. We believe that the combination of this report with other reports of primary-level TSI (see Pressley & El-Dinary, 1993; Pressley, El-Dinary, Gaskins, et al., 1992) provides a much fuller portrait of comprehension strategies instruction than existed before we decided to learn from our educator colleagues—educators who were attempting to use basic research to improve education.

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Correspondence regarding this article can be directed to the first author at the Department of Counseling and Educational Psychology, State University of New York at Buffalo, Amherst, NY 14260.

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APPENDIX

A Sample SAIL Lesson

The following lesson was presented by one SAIL teacher to student participants. The lesson focuses on the story, "Mushroom in the Rain" (Ginsburg, 1991; see Story Lessons and Recall Measures in the methods section for a synopsis of the story). SAIL teachers differ somewhat in their instructional practices as they tailor instruction to meet the needs of their students. Also, their emphasis on specific SAIL components varies as the year progresses and as students become more competent readers. However, the lesson highlights key features that are typical to SAIL instruction.

The SAIL teacher (T) began her "Mushroom in the Rain" lesson by reviewing what good readers do:

T: Well, today's reading group is almost at the end of the second grade. And we have spent the whole year learning so much about being good readers, and you have become so much better readers than you were at the beginning of second grade; it's incredible. And I think the reason why you've become such good readers is because of what you've learned this year. Let's just summarize what we've learned about being a good reader this year, being an expert reader—what you have learned that you know now that you didn't know before the second grade. Let's talk.

Taking her cue, the students named and described the various problem-solving and comprehension strategies they had used throughout the year and talked about how those strategies helped them. As students began to talk about visualizing, the teacher gave a personal example of her use of the visualizing strategy:

T: Do you know what I do when I'm reading? I try, as I'm reading a novel, to make a picture in my mind of the events that are aking place.

If the story takes place in the setting of a woods, I try to visualize the woods in my brain, and I try to visualize what's happening, and it helps me remember when I want to summarize, when I want to look back, and try to think what's happened so far. I try to think with my brain, but also use my visualizing strategy to picture, oh yes, this is what happened first, yes this is what happened second, and that helps me remember.

After reviewing individual strategies, the teacher brought up the importance of the flexible use of a repertoire of strategies. She informed students that different strategies were used for different purposes and applied to different text types. The teacher addressed this issue directly when she asked students:

T: How do you know which one to pull out? How do you know? A carpenter doesn't pull out a hammer when he wants to screw in a screw. You have to make those decisions don't you? Now as expert readers you have to make decisions which strategy to use, which one will work. Do you want to make a prediction at the end of the story necessarily? Do you want to use a fix-up strategy if you know all the words and you understand what the story's about? Do you want to visualize? If there's a picture right there and, gee, that's exactly what you're thinking is happening in the story, it looks just like what you're imagining? How do you know when to use a connection . . . a think-aloud strategy? How do you know?

After discussing their answers, the teacher reminded students to apply their repertoire of strategies when reading, thereby emphasizing student choice and control.

T: Today, the story we're going to read—I want you to try to use your, now that you're expert second-grade readers, use your bag of strategy tricks and select the one that's going to help you as you read. Can you use more than one during a reading time?

S: Yes.

T: Absolutely. But you are now in control, you are now readers in control, you have your own bags, you have your own tricks, your own strategies, your own tools to help you understand what you read and now you are the boss. You choose what strategy is going to help you understand the story.

Following the strategy review, the teacher mentioned that in addition to using all the strategies, she wanted students to focus on visualizing. She then started the lesson by reading the title and first page and modeling her thinking processes for students.

T: One day, well, I, let's see, the title's "Mushroom in the Rain." I know what mushrooms are because we've been studying plants, and we saw a filmstrip just day before yesterday.

(She then reads the first page.)

T: Well, I know what a clearing is, it's where, in the woods, where they've taken down a lot of trees, or it's an open space where there aren't a lot of tall bushes and trees and things like that. Well, I guess for an ant, though, that could be pretty small. I'm visualizing a clearing as a grown-up would be. It would be a big place without trees. But I'll bet a clearing for a little tiny ant would just be a place where there

are maybe bits of leaves to make shadows, but just maybe, just grass, just growing around. And so he's looking, he's looking for something to act sort of like a . . .

S: . . . cover.

S: . . . umbrella.

T: . . . like an umbrella, like an umbrella, to keep him, to keep him dry until the rain stops. (She continues to read: "He sat there waiting for the rain to stop, but the rain came down and came down.")

T: You know, that's happened to me, what I'm picturing. I'm visualizing when I was stranded here at school, without my car, with my bag of school papers to grade, waiting under the overhang, that was almost like my umbrella, waiting for the rain to slow down a little bit, so that I could walk home to my house. Gosh, sometimes it seems like forever till the rain stops. Has that ever happened to you?

S: I have a prediction, um, this is gonna be like, um, like "The Mitten" one, like um these um, all these insects are gonna try to come in.

T: You think so?

S: Yeah.

T: What made you think that?

S: Well, I see another insect.

T: And so . . .

S: . . . Hmmm . . .

T: You made that connection? Well, we'll see if you're right. Do you want to take charge now, S6? Are you ready to take charge. I would like you to. Will you try today?

In the preceding section, the teacher models for students her use of visualizing and making connections between story events and her personal experiences. She then encourages students, in context, to think of similar situations when they were stranded in the rain. A student, without prompting, makes a prediction, comparing the current story with a story the class read in the middle of the year. The teacher asks the student to provide some support, and the student alludes to a picture clue. Finally, the teacher turns control over to a student, who serves as lesson leader for the day.

Students take turns reading story segments. When students come to a word they do not know, they often use one of their fix-up (e.g., problem-solving) strategies spontaneously. However, sometimes, the teacher cues students, as in the following example:

T: Use a strategy.

S: (rereading) ". . . went, then, wait, dry than wet."

T: Does that make sense?

S: (The child nods and continues reading.)

After reading a segment, a student either spontaneously thinks aloud or is prompted to do so. Thinking aloud takes the form of summarizing story content, venturing a prediction,

or offering an interpretation. Often, other students, either on their own, or prompted by the teacher or the student leader, offer their opinions. For example, after a child thinks aloud, the student leader asks:

S: Anyone else want to read?

But first, a student returns to the topic of "The Mitten":

S: I want to predict something. Well, I made a connection. Well, um, this is reminding me of "The Mitten" when um, when lots of animals were trying to get into one mitten, one little mitten, and then it exploded.

As students read, they continue to make a connection between "The Mitten" and "Mushroom in the Rain." Students and teacher discuss different versions of the story. Then, students continue to think aloud and discuss each text segment as it is read. To stimulate discussion at one point the teacher asks:

T: Can you visualize what it would be like, to be that, to be those characters? That's what I try to do when I'm reading. I try to put myself in the character's place and it helps me understand how they're feeling.

During one text segment discussion, a student observes an emerging pattern—the animals entering the mushroom are getting increasingly bigger. As students volunteer connections, opinions, or predictions like the preceding one, the teacher encourages students to keep them in mind as the group reads on.

As students continue to read, they talk about the various animals entering the mushroom. Extended discussion ensues when the rabbit appears on the scene. Students recognize that the rabbit's desire to get under the mushroom differs from the motives of other animals. One student recalls a directly relevant personal experience about seeing a pet rabbit chased by a fox. Another student predicts that the fox will say he's wet so that he can enter the mushroom to get the rabbit. Still another student connects the episode to a personal experience:

S: Prediction, well, not a prediction, but whenever my sister was at um, Camp Sunshine, a fox, whenever they were staying over in a tent, a fox came up to their um, tent, right up in front, and then they, I don't remember what they did together, and then the fox ran away into the woods.

T: So you've made a connection, how does that relate to the story? What are you thinking?

S: Well . . .

T: What do you think might happen?

S: Probably the fox's um, just like, the fox is probably after the, like they're in a tent kind of like . . .

T: Okay, that was your connection, the tent was, kind of like the mushroom?

S: (The student concurs.)

With the various predictions raised by students, the group decides to take a vote about whether the fox will or will not get the rabbit. They decide to read on to verify their predictions.

A student is selected to read the next segment. The child experiences great difficulty reading the page, and frequently skips over unknown words. The teacher suggests that the group reread the last page together. One student agrees that group reading is a good idea because what the other student read, "doesn't make sense." Another student elaborates: "Doesn't really make sense because he skipped a few words." The teacher reinforces, seizing an opportunity to interject some explicit instruction about what good readers do:

T: "Well, let's . . . why don't we, why don't we read it. I think that's a good, I think that's a good idea. I do that. I do that. I go back and reread when I don't understand. That's what good readers do. Let's go back to the top of the page then . . ." (and they read the page together).

The students then discuss how the other animals are protecting the rabbit and where the rabbit is located. One student suggests that the rabbit is hiding in the middle of the other animals. Another student, pointing to a picture clue, shows the rabbit on the far side of the mushroom, away from the fox. Then one student observes:

S: Um, that, um, when it says mushroom, it's like it's a room, it's like a house, and then a room.

T: Oh, it's like, right now, is it acting like their house in a way? It is a shelter, isn't it? It is a shelter.

S: A "mush-*room*."

S: Like an igloo.

S: With all these people in it, but it's kind of like a room, but lots of people in it, so, a room, but, people are mushed in there.

T: Are they kind of smooshed all together?

S: Yeah, "*mush*-room."

In this case, two students picked up the parts of the word "mushroom"; one made a parallel between the mushroom serving as a room to hold the animals; the other child focused on the fact that the animals were "mushed" together.

A short time later, a student had difficulty reading:

S: I can't figure out what he did with his tail, but all . . .

T: Okay, so what can you do, cause you've got some strategies you can use.

S: Skip it and go on.

T: Why don't you try that?

S: (The student skips and continues reading until the end of the passage.)

The student then thinks aloud, summarizing and expressing her ideas about why the fox couldn't find the rabbit. The teacher does not go back to discuss the word, "flicked," that the student missed. Instead, she focuses on whether the student got the gist of the passage.

As the lesson proceeds, students continue to discuss their views and offer new or modified predictions. Throughout these discussions, the teacher rephrases students' comments, asks

for elaborations, or initiates a discussion with a question. However, she does not present her own interpretation of story events.

The group decides to read the last pages of the story together. They come to the question the ant poses about how all the animals could have fit under one small mushroom. One child suggests that the mushroom grew because " . . . the sun came out and it got plenty of water to grow a little more." Other students concur that the mushroom grew, offering their support. But one student says that the animals caused the mushroom to stretch. So the teacher asks: "Do you think they stretched it or do you think that it grew?" Most agree that the mushroom grew.

The discussion then returns to the story, "The Mitten." The teacher and students discuss similarities and differences between the two stories (e.g., The mitten popped and mushroom stayed just fine.). The teacher praises the students for making a connection between the two stories.

The lesson concludes with an evaluation of strategy use and ample praise for student use of strategies during the lesson:

T: Well, what I'm so impressed with is the fact that you chose strategies to help you understand and I heard some strategies that you used that I didn't help you (with). In the beginning of second grade, I had to say, "Okay, today we're all going to make predictions; today we're all going to summarize; today we're all going to try to visualize."

S: I remember that.

T: Do you remember that? Do you remember when I, we practiced and practiced and practiced. And I don't have to do that anymore because now you're the bosses of your reading. You choose the strategies that help you understand. And I am very proud of your thinking. I hope you carry all these strategies in your strategy bag, which is sort of imaginary, isn't it? Sort of imaginary. I hope you carry them to third grade and to fourth grade, and to fifth grade, and the rest of your life because they'll always help you. They help me. And if they help me, and I'm a grown-up, they certainly are gonna help you every step along the way. Give yourselves pats on the back for doing such a super, super thinking job. You got more out of this story I think than I did when I read it! Good job!

NRRC National Reading Research Center

318 Aderhold, University of Georgia, Athens, Georgia 30602-7125
2102 J. M. Patterson Building, University of Maryland, College Park, MD 20742

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